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10/051,229	01/22/2002	Terry M. Turpin	509622000700	7994

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EXAMINER

BELLO, AGUSTIN

ART UNIT	PAPER NUMBER
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2613

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/051,229	Applicant(s) TURPIN ET AL.	
	Examiner Agustin Bello	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03/26/09 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki (U.S. Patent No. 6,185,040) in view of Miron (U.S. Patent No. 7,002,696).

Regarding claims 1, 3, 5, 9, 11, 13, Shirasaki teaches a transmitting system comprising: a processor (reference numeral 206 in Figure 16) to process at least one collimated input beam (e.g. output of collimator 322a in Figure 16) which has been modulated with a data signal (column 1 lines 55-57 and column 11 lines 21-22) to produce multiple time-delayed output taps (inherent delay caused by element 206 in Figure 16, also shown in Figure 7), the multiple time-delayed output taps being spatially distributed (column 4 lines 1-5), spatially distinct (as seen in Figure 7) and independently phase shifted (column 9 lines 46-47); an integration lens (reference numeral 322b in Figure 16) to receive the phase modulated output taps and to reintegrate the

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phase modulated output taps into a single encoded beam with a time series chip sequence, and an optical fiber (reference numeral 318 in Figure 16) to receive the integrated encoded beam from the integration lens and to transmit the integrated encoded beam, and a reflective surface configured to impart a desired amplitude profile onto the output taps (column 6 lines 1-19). Shirasaki differs from the claimed invention in that Shirasaki fails to specifically teach that the processor is configured to maintain the collimation of the input beam so that the multiple time-delayed output taps maintain the collimation of the input beam and further that the reflective surface is variable and varies in reflectivity along its length. However, Miron, in the same field of transmitting systems, teaches that these concepts are well known in the art (Figure 2a, 2b, showing collimation; column 9 lines 23-49 describing variable reflectivity surface shown as elements 201-206; column 10 lines 5-44 disclosing variation in reflectivity from total reflection to partial reflection as light traverses the length of the reflective surface). One skilled in the art would have been motivated to form a processor configured to maintain the collimation of the input beam so that the multiple time-delayed output taps maintain the collimation of the input beam in order to prevent beam interference. Furthermore, one skilled in the art would have been motivated to include a variable reflectivity surface in order to allow for tuning of the optical device (column 12 lines 20-26 of Miron). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to form the processor so that it is configured to maintain the collimation of the input beam so that the multiple time-delayed output taps maintain the collimation of the input beam, and further to include a variable reflectivity surface.

Regarding claims 2, 6, 7, 10, 12, 14, Shirasaki teaches a receiving system comprising: a processor (reference numeral 206 lower in Figure 16) to process the encoded collimated light

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taps received from a transmitter to produce multiple time-delayed output taps (inherent delay caused by element 206 in Figure 16, also shown in Figure 7), the multiple time- delayed output taps being spatially distributed (column 4 lines 1-5), spatially distinct (as seen in Figure 7) and independently phase shifted (column 9 lines 46-47); an integration lens (reference numeral 322b in Figure 16) to receive the phase-shifted output taps and to reintegrate the phase-shifted output taps into a single decoded beam; and a photo detector (column 11 lines 52-56) to receive the integrated decoded beam and to generate an output. Shirasaki differs from the claimed invention in that Shirasaki fails to specifically teach that the processor is configured to maintain the collimation of the input beam so that the multiple time-delayed output taps maintain the collimation of the input beam and further that the reflective surface is variable and varies in reflectivity along its length. However, Miron, in the same field of transmitting systems, teaches that these concepts are well known in the art (Figure 2a, 2b showing collimation; and column 9 lines 23-49 describing variable reflectivity surface; column 10 lines 5-44 disclosing variation in reflectivity from total reflection to partial reflection as light traverses the length of the reflective surface). One skilled in the art would have been motivated to form a processor configured to maintain the collimation of the input beam so that the multiple time-delayed output taps maintain the collimation of the input beam in order to prevent beam interference. Furthermore, one skilled in the art would have been motivated to include a variable reflectivity surface in order to allow for tuning of the optical device (column 12 lines 20-26 of Miron). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to form the processor so that it is configured to maintain the collimation of the input beam so that the multiple time-

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delayed output taps maintain the collimation of the input beam, and further to include a variable reflectivity surface.

Regarding claims 15-20, Shirasaki teaches that the modulation can be implemented in the spectral domain (e.g. each optical signal is shifted in phase with respect to each adjacent wavelength).

Regarding claims 21-26, Shirasaki's structure can be used as an optical equalizer.

Regarding claims 27-32, Shirasaki's structure can be used in a wide-band signal generation.

Regarding claims 4 and 8, Shirasaki differs from the claimed invention in that Shirasaki fails to specifically teach that the optical tapped delay device includes an etched plate having an etch depth sufficient to produce a desired phase shift through the time delayed output taps. However, etched plates for producing phase shifts in optical communication signals are well known in the art. One skilled in the art would have been motivated to employ an etched plate in the device of Shirasaki in order to produce a more pronounced phase shift in the signals output from the device. Moreover, Shirasaki's disclosure of a block structure that could have any suitable shape would have suggested an etched plate to one skilled in the art. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to employ an etched plate in the device of Shirasaki.

4. Claims 33-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirasaki in view of Miron and Ranalli (U.S. Patent No. 6,285,500).

Regarding claims 33, 36, Shirasaki teaches an optical tapped delay line device having a cavity to process at least one collimated input beam to produce multiple time delayed spatially

distributed, spatially distinct (as seen in Figure 7) output taps in a linear array (as discussed above in the rejection of claim 1), establishing a region of spatial overlap of the optical tapped delay lines beams (reference numeral 136 in Figure 7), and a two-dimensional photo detector array (reference numeral 118 in Figures 11 and 12) arranged to sample the interfering taps and spatially operate on the beams in the regions of spatial overlap.

Shirasaki differs from the claimed invention in that Shirasaki fails to specifically teach a second input beam which projects at an angle to a plane of the optical tapped delay line linear array to interfere with each optical tapped delay line beam or an electronic amplifier to sample the photodetector array. However, Ranalli, in the same field of optics, teaches that it is well known to introduce a second beam to an optical system and allow the taps to interfere with a first set of delayed taps (see Figure 5). One skilled in the art would have been motivated to do so in order to reduce crosstalk and achieve greater optical performance (see abstract of Ranalli). Furthermore, electrical amplifiers for sampling photodetector arrays are well known in the art and readily available. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to introduce a second input beam which projects at an angle to a plane of the optical tapped delay line linear array to interfere with each optical tapped delay line beam as well as electrical amplifiers for sampling the photodetector array.

Shirasaki further differs from the claimed invention in that Shirasaki fails to specifically teach that the processor is configured to maintain the collimation of the input beam so that the multiple time-delayed output taps maintain the collimation of the input beam and further that the reflective surface is variable in that the reflectivity varies along the length of the variable reflective surface. However, Miron, in the same field of transmitting systems, teaches that these

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concepts are well known in the art (Figure 2a, 2b showing collimation; and column 9 lines 23-49 describing variable reflectivity surface; column 10 lines 5-44 disclosing variation in reflectivity from total reflection to partial reflection as light traverses the length of the reflective surface). One skilled in the art would have been motivated to form a processor configured to maintain the collimation of the input beam so that the multiple time-delayed output taps maintain the collimation of the input beam in order to prevent beam interference. Furthermore, one skilled in the art would have been motivated to include a variable reflectivity surface in order to allow for tuning of the optical device (column 12 lines 20-26 of Miron). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to form the processor so that it is configured to maintain the collimation of the input beam so that the multiple time-delayed output taps maintain the collimation of the input beam, and further to include a variable reflectivity surface.

Regarding claim 34, the combination of references teaches that the optical tapped delay line input beam is modulated with a data signal (as discussed in claim 1) and the second input beam is a coherent reference (inherent in the use of laser light in both systems).

Regarding claim 35, the combination of references teaches that the optical tapped delay line input beam is a coherent reference (inherent in the use of laser light in Shirasaki) and the second input beam is modulated with a data signal (column 7 lines 54-61 of Ranalli).

Regarding claims 37, the combination of references teaches that output beam to output beam delays propagate in a same direction (as seen in Figure 5 of Ranalli) in the optical tapped delay line device and the second optical tapped delay line device and an output of the receiving system is a correlation of the signals on the input taps.

Regarding claim 38, the combination of references differs from the claimed invention in that it fails to specifically teach that the output beam to output beam delays propagate in opposite directions in the optical tapped delay line device and the second optical tapped delay line device, and an output of the receiving system is a convolution of the signals on the input taps. However, one skilled in the art would clearly have recognized that it would have been possible to arrange the propagation of output beam delays in a number of different configurations, including one in which the output beam delays propagate in opposite directions in the optical tapped delay line device and the second optical tapped delay line device, hence providing a convolution of the input signals. One skilled in the art would have been motivated to do so in order to further mix the first and second signals due to interference. Moreover, Ranalli clearly suggests convolution in the mixture of signals produced by the device. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to allow the output beam to output beam delays that propagate in opposite directions in the optical tapped delay line device and the second optical tapped delay line device, thereby producing an output of the receiving system which is a convolution of the signals on the input taps.

Response to Arguments

5. Applicant's arguments filed 03/26/09 have been fully considered but they are not persuasive.

Regarding applicant's argument that Miron fails to teach a surface having a variable reflectivity that varies in reflectivity along its length, the examiner disagrees. As noted in the office action, Miron clearly provides a variable reflectivity surface that varies in reflectivity along its length in that, as previously noted, the spacing between the reflective layers is variable

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thereby allowing adjustment to the optical path difference (OPD) which is an even multiple of the elementary optical path difference (EOPD) and further allows control over optical intensity of the output beams (column 7 lines 1-10). Furthermore, the variable reflectivity surface can be broadly considered as being variably reflective along its length being that the light which propagates the length of the reflective surface encounters reflective materials which vary from fully reflective to partially reflective to fully reflective to partially reflective, etc. Moreover, applicant's reading of a "surface" is overly narrow, and the examiner considers the elements 201-206 as the claimed surface, thereby further substantiating the examiner's arguments that Miron teaches a variable reflectivity surface.

As to applicant's argument that Shirasaki fails to specifically teach spatially distinct beams, the examiner again disagrees. Shirasaki's beams are clearly distinct at surface 122, and what happens after this point is of no consequence since the claim language fails to recite any such limitation. Furthermore, the examiner clearly relies on Miron and not Shirasaki for disclosure of maintaining collimation. Finally, Shirasaki clearly teaches that each of the spatially distinct beams are independently phase shifted by virtue of the fact that each beam is delayed, or phase shifted, a predetermined amount with respect to the other beams. The fact that Shirasaki discloses a constant phase shift does not detract from the fact that each beam is independently phase shifted.

Conclusion

6. This is a continuation of applicant's earlier Application No. 10/051,229. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the

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earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

/Agustin Bello/

Primary Examiner, Art Unit 2613